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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,700	11/25/2003	Masaru Kihara	032134	3038

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EXAMINER

ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
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1745

MAIL DATE	DELIVERY MODE
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06/29/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/720,700

Applicant(s)

KIHARA, MASARU

Examiner

Raymond Alejandro

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/01/07 has been entered.

The following Examiner's letter responds to the amendment accompanying the aforesaid RCE. Applicant has overcome the prior art rejection under Section 103. Refer to the foregoing amendment for additional details concerning applicant's rebuttal arguments and remarks. However, the present claims (including newly added claims 11-18) are again rejected over newly discovered references as seen hereinbelow and for the reasons of record:

Claim Disposition

1. Claim 9 has been cancelled.
2. Claims 11-18 are new.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 7-8, 10-11 and 17-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohno et al 6130006 view of Noda et al 5527639.

The present application is geared toward a nickel-hydrogen secondary battery wherein the disclosed inventive concept comprises the specific hydrogen-absorbing alloy.

As to claims 1 and 11:

Kohno et al disclose illustrate in Figure 2 a battery comprising a case 1, a positive electrode 2, a negative electrode 4, and a separator 3, and alkaline electrolyte (COL 32, line 14 to COL 33, line 60/ FIGURE 2).

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Kohno et al's positive electrode includes a nickel hydroxide powder; and may also contain at least one oxide or hydroxide of metal selected from the group consisting of zinc and cobalt (COL 32, lines 49-62).

Kohno et al's negative electrode includes a hydrogen absorbing alloy powder (COL 33, lines 5-10). **Table 7** below shows examples hydrogen absorbing alloy compositions comprising Mg, at least La, at least Co, Al, and nickel. *Thus, Kohno et al directly exemplified and show with sufficient specificity the hydrogen absorbing alloy composition claimed by the applicant.*

TABLE 7

Compositions		40
Example 45	$\text{Mg}_{0.31}\text{La}_{0.69}(\text{Ni}_{0.8}\text{Co}_{0.1}\text{Al}_{0.1})_{3.2}$	
Example 46	$\text{Mg}_{0.3}\text{La}_{0.5}\text{Pr}_{0.2}(\text{Ni}_{0.8}\text{Mn}_{0.15}\text{Si}_{0.05})_{3.4}$	
Example 47	$\text{Mg}_{0.27}\text{La}_{0.53}\text{Nd}_{0.2}(\text{Ni}_{0.8}\text{Mn}_{0.1}\text{Co}_{0.1})_{3.05}$	
Example 48	$\text{Mg}_{0.25}\text{La}_{0.75}(\text{Ni}_{0.85}\text{Co}_{0.1}\text{Fe}_{0.05})_{3.7}$	
Example 49	$\text{Mg}_{0.24}\text{La}_{0.76}(\text{Ni}_{0.8}\text{Mn}_{0.15}\text{Ga}_{0.05})_{3.65}$	45
Example 50	$\text{Mg}_{0.34}\text{La}_{0.66}(\text{Ni}_{0.75}\text{Co}_{0.1}\text{Mn}_{0.1}\text{Al}_{0.05})_{3.33}$	
Example 51	$\text{Mg}_{0.25}\text{La}_{0.45}\text{Pr}_{0.3}(\text{Ni}_{0.68}\text{Co}_{0.2}\text{Cu}_{0.1}\text{Zn}_{0.02})_{3.5}$	
Example 52	$\text{Mg}_{0.28}\text{La}_{0.62}\text{Nd}_{0.1}(\text{Ni}_{0.84}\text{Cu}_{0.1}\text{Sn}_{0.05}\text{B}_{0.01})_{3.3}$	

As to claims 7 and 17:

Kohno et al's positive electrode may also contain at least one oxide or hydroxide of metal selected from the group consisting of zinc and cobalt (COL 32, lines 49-62).

As to claims 10 and 18:

Kohno et al's negative electrode is a hydrogen absorbing alloy powder (COL 33, lines 5-10) and may further include La, Ce, Pr, Nd and Y (COL 11, lines 45-55). Examples 45-47 illustrates the inclusion of Co and Al as well (See EXAMPLES 45-47).

Example 45	$\text{Mg}_{0.31}\text{La}_{0.69}(\text{Ni}_{0.8}\text{Co}_{0.1}\text{Al}_{0.1})_{3.2}$
Example 46	$\text{Mg}_{0.3}\text{La}_{0.5}\text{Pr}_{0.2}(\text{Ni}_{0.8}\text{Mn}_{0.15}\text{Si}_{0.05})_{3.4}$
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Example 57	$\text{La}_{0.57}\text{Pr}_{0.17}\text{Mg}_{0.25}\text{Ti}_{0.01}(\text{Ni}_{0.92}\text{Co}_{0.05}\text{Mn}_{0.02}\text{Al}_{0.01})_{3.54}$
Example 82	$\text{La}_{0.63}\text{Nd}_{0.1}\text{Mg}_{0.27}(\text{Ni}_{0.85}\text{Co}_{0.1}\text{Cr}_{0.03}\text{Fe}_{0.02})_{3.7}$

Kohno et al disclose a nickel-hydrogen secondary battery according to the aforementioned aspects. However, Kohno et al do not expressly disclose the specific additional element/compound of positive electrode.

As to claims 1, 8 and 11:

Noda et al disclose a galvanic cell (TITLE/ABSTRACT) such as nickel-hydrogen cell (COL 5, lines 4-6) wherein the positive electrode active material includes Nb_2O_5 , and/or WO_3 (COL 5, lines 16-32).

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the art at the time the invention was made to use the specific additional element/compound of positive electrode of Noda et al in the positive electrode of Kohno et al as it is well known in the art positive electrodes having such specific additional element are excellent in utilization factor of nickel hydroxide under atmosphere ranging from an ordinary temperature to a high temperature. Thus, such an additional element positively affects the charging characteristic of the electrode, particularly at a high temperature. *Furthermore, it is known in the art that incorporation of the foregoing additional element/compound in the positive electrode makes it possible to lower the rate at which the cobalt compound in the nickel hydroxide active material is dissolved and precipitated in the electrolytic solution. As a result, the overall structure of the positive electrode is rendered denser, thereby preventing other metals such as Mn, Al, Ca and Mg constituting the hydrogen-absorbing alloy which have been eluted with the electrolytic solution after prolonged storage from penetrating into the positive electrode, making it possible to maintain a good conduction network.*

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7. Claims 1, 7-8, 10-11 and 17-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohno et al 6130006 view of Fleischer et al 2002/0122980.

As to claims 1 and 11:

Kohno et al disclose illustrate in Figure 2 a battery comprising a case 1, a positive electrode 2, a negative electrode 4, and a separator 3, and alkaline electrolyte (COL 32, line 14 to COL 33, line 60/ FIGURE 2).

Kohno et al's positive electrode includes a nickel hydroxide powder; and may also contain at least one oxide or hydroxide of metal selected from the group consisting of zinc and cobalt (COL 32, lines 49-62).

Kohno et al's negative electrode includes a hydrogen absorbing alloy powder (COL 33, lines 5-10). **Table 7** below shows examples hydrogen absorbing alloy compositions comprising Mg, at least La, at least Co, Al, and nickel. *Thus, Kohno et al directly exemplified and show with sufficient specificity the hydrogen absorbing alloy composition claimed by the applicant.*

TABLE 7

Compositions		40
Example 45	Mg _{0.31} La _{0.69} (Ni _{0.8} Co _{0.1} Al _{0.1}) _{3.2}	45
Example 46	Mg _{0.3} La _{0.5} Pr _{0.2} (Ni _{0.8} Mn _{0.15} Si _{0.05}) _{3.4}	
Example 47	Mg _{0.27} La _{0.53} Nd _{0.2} (Ni _{0.8} Mn _{0.1} Co _{0.1}) _{3.05}	
Example 48	Mg _{0.25} Lm _{0.75} (Ni _{0.85} Co _{0.1} Fe _{0.05}) _{3.7}	
Example 49	Mg _{0.24} Lm _{0.76} (Ni _{0.8} Mn _{0.15} Ga _{0.05}) _{3.65}	
Example 50	Mg _{0.34} Lm _{0.66} (Ni _{0.75} Co _{0.1} Mn _{0.1} Al _{0.05}) _{3.33}	
Example 51	Mg _{0.25} Lm _{0.45} Pr _{0.3} (Ni _{0.68} Co _{0.2} Cu _{0.1} Zn _{0.02}) _{3.5}	
Example 52	Mg _{0.28} Lm _{0.62} Nd _{0.1} (Ni _{0.84} Cu _{0.1} Sn _{0.05} B _{0.01}) _{3.3}	

As to claims 7 and 17:

Kohno et al's positive electrode may also contain at least one oxide or hydroxide of metal selected from the group consisting of zinc and cobalt (COL 32, lines 49-62).

As to claims 10 and 18:

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Kohno et al's negative electrode is a hydrogen absorbing alloy powder (COL 33, lines 5-10) and may further include La, Ce, Pr, Nd and Y (COL 11, lines 45-55). Examples 45-47 illustrates the inclusion of Co and Al as well (See EXAMPLES 45-47).

Example 45	$\text{Mg}_{0.31}\text{La}_{0.69}(\text{Ni}_{0.8}\text{Co}_{0.1}\text{Al}_{0.1})_{3.2}$
Example 46	$\text{Mg}_{0.3}\text{La}_{0.5}\text{Pr}_{0.2}(\text{Ni}_{0.8}\text{Mn}_{0.15}\text{Si}_{0.05})_{3.4}$
Example 47	$\text{Mg}_{0.27}\text{La}_{0.53}\text{Nd}_{0.2}(\text{Ni}_{0.8}\text{Mn}_{0.1}\text{Co}_{0.1})_{3.05}$

Example 57 $\text{La}_{0.57}\text{Pr}_{0.17}\text{Mg}_{0.25}\text{Ti}_{0.01}(\text{Ni}_{0.92}\text{Co}_{0.05}\text{Mn}_{0.02}\text{Al}_{0.01})_{3.54}$

Example 82 $\text{La}_{0.63}\text{Nd}_{0.1}\text{Mg}_{0.27}(\text{Ni}_{0.85}\text{Co}_{0.1}\text{Cr}_{0.03}\text{Fe}_{0.02})_{3.7}$

Kohno et al disclose a nickel-hydrogen secondary battery according to the aforementioned aspects. However, Kohno et al do not expressly disclose the specific additional element/compound of positive electrode.

As to claims 1, 8 and 11:

Fleischer et al disclose electrochemical cells (TITLE/ABSTRACT) such as nickel/metal hydride using a hydrogen storage alloy (P0020 & 0006) wherein the cathode may be made from one or more of a number of materials including nickel hydroxides, and WO_3 and/or MO_2 , where M is Nb, among others (P0058).

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the art at the time the invention was made to use the specific additional element/compound of positive electrode of Fleischer et al in the positive electrode of Kohno et al as Fleischer et al disclose that it is known to make cathode comprising one or more of the above-mentioned compounds for the purposes of increasing capacity and open circuit voltage, and electrochemical stability. Additionally, it is well-known in the art that positive electrodes having such specific additional element are excellent in utilization factor of nickel hydroxide under

atmosphere ranging from an ordinary temperature to a high temperature. Thus, such an additional element positively affects the charging characteristic of the electrode, particularly at a high temperature. *Furthermore, it is known in the art that incorporation of the foregoing additional element/compound in the positive electrode makes it possible to lower the rate at which the cobalt compound in the nickel hydroxide active material is dissolved and precipitated in the electrolytic solution. As a result, the overall structure of the positive electrode is rendered denser, thereby preventing other metals such as Mn, Al, Ca and Mg constituting the hydrogen-absorbing alloy which have been eluted with the electrolytic solution after prolonged storage from penetrating into the positive electrode, making it possible to maintain a good conduction network.*

8. Claims 1, 7-8, 10-11 and 17-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohno et al 6130006 view of Imoto et al 2003/0096166.

The present application is geared toward a nickel-hydrogen secondary battery wherein the disclosed inventive concept comprises the specific hydrogen-absorbing alloy.

As to claims 1 and 11:

Kohno et al disclose illustrate in Figure 2 a battery comprising a case 1, a positive electrode 2, a negative electrode 4, and a separator 3, and alkaline electrolyte (COL 32, line 14 to COL 33, line 60/ FIGURE 2).

Kohno et al's positive electrode includes a nickel hydroxide powder; and may also contain at least one oxide or hydroxide of metal selected from the group consisting of zinc and cobalt (COL 32, lines 49-62).

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Kohno et al's negative electrode includes a hydrogen absorbing alloy powder (COL 33, lines 5-10). **Table 7** below shows examples hydrogen absorbing alloy compositions comprising Mg, at least La, at least Co, Al, and nickel. *Thus, Kohno et al directly exemplified and show with sufficient specificity the hydrogen absorbing alloy composition claimed by the applicant.*

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Compositions		40
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Example 48	$\text{Mg}_{0.25}\text{La}_{0.75}(\text{Ni}_{0.85}\text{Co}_{0.1}\text{Fe}_{0.05})_{3.7}$	
Example 49	$\text{Mg}_{0.24}\text{La}_{0.76}(\text{Ni}_{0.8}\text{Mn}_{0.15}\text{Ga}_{0.05})_{3.65}$	45
Example 50	$\text{Mg}_{0.34}\text{La}_{0.66}(\text{Ni}_{0.75}\text{Co}_{0.1}\text{Mn}_{0.1}\text{Al}_{0.05})_{3.33}$	
Example 51	$\text{Mg}_{0.25}\text{La}_{0.45}\text{Pr}_{0.3}(\text{Ni}_{0.68}\text{Co}_{0.2}\text{Cu}_{0.1}\text{Zn}_{0.02})_{3.5}$	
Example 52	$\text{Mg}_{0.28}\text{La}_{0.62}\text{Nd}_{0.1}(\text{Ni}_{0.84}\text{Cu}_{0.1}\text{Sn}_{0.05}\text{B}_{0.01})_{3.3}$	

As to claims 7 and 17:

Kohno et al's positive electrode may also contain at least one oxide or hydroxide of metal selected from the group consisting of zinc and cobalt (COL 32, lines 49-62).

As to claims 10 and 18:

Kohno et al's negative electrode is a hydrogen absorbing alloy powder (COL 33, lines 5-10) and may further include La, Ce, Pr, Nd and Y (COL 11, lines 45-55). Examples 45-47 illustrates the inclusion of Co and Al as well (See EXAMPLES 45-47).

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Kohno et al disclose a nickel-hydrogen secondary battery according to the aforementioned aspects. However, Kohno et al do not expressly disclose the specific additional element/compound of positive electrode.

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As to claims 1, 8 and 11:

Imoto et al disclose Nickel-Hydrogen storage batteries (TITLE/ABSTRACT/P0009, 0036, 0053) comprising a hydrogen absorbing alloy as the negative electrode (P0011) and nickel hydroxide as the positive electrode (P0015) wherein the positive electrode further comprises incorporated amounts of Nb and W compounds such as Nb₂O₅ (P0015-0016, 0012, 0023-0024, 0044-0046) and/or WO₃ and/or WO₂ (P0015-0016, 0012).

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the art at the time the invention was made to use the specific additional element/compound of positive electrode of Imoto et al in the positive electrode of Kohno et al as Imoto et al disclose that the incorporation of the foregoing additional element/compound in the positive electrode makes it possible to lower the rate at which the cobalt compound in the nickel hydroxide active material is dissolved and precipitated in the electrolytic solution. As a result, the overall structure of the positive electrode is rendered denser, thereby preventing other metals such as Mn, Al, Ca and Mg constituting the hydrogen-absorbing alloy which have been eluted with the electrolytic solution after prolonged storage from penetrating into the positive electrode, making it possible to maintain a good conduction network.

9. Claims 1, 7-8, 10-11 and 17-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohno et al 6130006 view of Sato et al 2004/0234865.

The present application is geared toward a nickel-hydrogen secondary battery wherein the disclosed inventive concept comprises the specific hydrogen-absorbing alloy.

As to claims 1 and 11:

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Kohno et al disclose illustrate in Figure 2 a battery comprising a case 1, a positive electrode 2, a negative electrode 4, and a separator 3, and alkaline electrolyte (COL 32, line 14 to COL 33, line 60/ FIGURE 2).

Kohno et al's positive electrode includes a nickel hydroxide powder; and may also contain at least one oxide or hydroxide of metal selected from the group consisting of zinc and cobalt (COL 32, lines 49-62).

Kohno et al's negative electrode includes a hydrogen absorbing alloy powder (COL 33, lines 5-10). **Table 7** below shows examples hydrogen absorbing alloy compositions comprising Mg, at least La, at least Co, Al, and nickel. *Thus, Kohno et al directly exemplified and show with sufficient specificity the hydrogen absorbing alloy composition claimed by the applicant.*

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Example 48	$\text{Mg}_{0.25}\text{Lm}_{0.75}(\text{Ni}_{0.85}\text{Co}_{0.1}\text{Fe}_{0.05})_{3.7}$	
Example 49	$\text{Mg}_{0.24}\text{Lm}_{0.76}(\text{Ni}_{0.8}\text{Mn}_{0.15}\text{Ga}_{0.05})_{3.65}$	45
Example 50	$\text{Mg}_{0.34}\text{Lm}_{0.66}(\text{Ni}_{0.75}\text{Co}_{0.1}\text{Mn}_{0.1}\text{Al}_{0.05})_{3.33}$	
Example 51	$\text{Mg}_{0.23}\text{Lm}_{0.43}\text{Pr}_{0.3}(\text{Ni}_{0.68}\text{Co}_{0.2}\text{Cu}_{0.1}\text{Zn}_{0.02})_{3.5}$	
Example 52	$\text{Mg}_{0.28}\text{Lm}_{0.62}\text{Nd}_{0.1}(\text{Ni}_{0.84}\text{Cu}_{0.1}\text{Sn}_{0.05}\text{B}_{0.01})_{3.3}$	

As to claims 7 and 17:

Kohno et al's positive electrode may also contain at least one oxide or hydroxide of metal selected from the group consisting of zinc and cobalt (COL 32, lines 49-62).

As to claims 10 and 18:

Kohno et al's negative electrode is a hydrogen absorbing alloy powder (COL 33, lines 5-10) and may further include La, Ce, Pr, Nd and Y (COL 11, lines 45-55). Examples 45-47 illustrates the inclusion of Co and Al as well (See EXAMPLES 45-47).

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 Example 47 $\text{Mg}_{0.27}\text{La}_{0.53}\text{Nd}_{0.2}(\text{Ni}_{0.8}\text{Mn}_{0.1}\text{Co}_{0.1})_{3.05}$

Example 57 $\text{La}_{0.57}\text{Pr}_{0.17}\text{Mg}_{0.25}\text{Ti}_{0.01}(\text{Ni}_{0.92}\text{Co}_{0.05}\text{Mn}_{0.02}\text{Al}_{0.01})_{3.54}$

Example 82 $\text{La}_{0.63}\text{Nd}_{0.1}\text{Mg}_{0.27}(\text{Ni}_{0.85}\text{Co}_{0.1}\text{Cr}_{0.03}\text{Fe}_{0.02})_{3.7}$

Kohno et al disclose a nickel-hydrogen secondary battery according to the aforementioned aspects. However, Kohno et al do not expressly disclose the specific additional element/compound of positive electrode.

As to claims 1, 8 and 11:

Sato et al disclose batteries such as nickel hydrogen cells which employ aqueous electrolytes (P0003, 0012) wherein the positive electrode active material is selected as appropriate for the type of battery and other consideration and includes Nb_2O_5 and/or WO_3 (P0209).

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the art at the time the invention was made to use the specific additional element/compound of positive electrode of Sato et al in the positive electrode of Kohno et al as Sato et al discloses that the foregoing element/compounds are suitable positive electrode active materials and can be selected as appropriate for the type of battery and other considerations. Thus, Sato et al disclose the suitability of employing the specifically claimed additional element/compound in the positive electrode. Imperative to note is that is well-known in the art that positive electrodes having such specific additional element are excellent in utilization factor of nickel hydroxide under atmosphere ranging from an ordinary temperature to a high temperature. Thus, such an additional element positively affects the charging characteristic of the

electrode, particularly at a high temperature. *Furthermore, it is known in the art that incorporation of the foregoing additional element/compound in the positive electrode makes it possible to lower the rate at which the cobalt compound in the nickel hydroxide active material is dissolved and precipitated in the electrolytic solution. As a result, the overall structure of the positive electrode is rendered denser, thereby preventing other metals such as Mn, Al, Ca and Mg constituting the hydrogen-absorbing alloy which have been eluted with the electrolytic solution after prolonged storage from penetrating into the positive electrode, making it possible to maintain a good conduction network.*

10. Claims 11 and 17-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kohno et al 6130006 view of Shinyama et al 2005/0019657.

The present application is geared toward a nickel-hydrogen secondary battery wherein the disclosed inventive concept comprises the specific hydrogen-absorbing alloy.

As to claim 11:

Kohno et al disclose illustrate in Figure 2 a battery comprising a case 1, a positive electrode 2, a negative electrode 4, and a separator 3, and alkaline electrolyte (COL 32, line 14 to COL 33, line 60/ FIGURE 2).

Kohno et al's positive electrode includes a nickel hydroxide powder; and may also contain at least one oxide or hydroxide of metal selected from the group consisting of zinc and cobalt (COL 32, lines 49-62).

Kohno et al's negative electrode includes a hydrogen absorbing alloy powder (COL 33, lines 5-10). **Table 7** below shows examples hydrogen absorbing alloy compositions comprising

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Mg, at least La, at least Co, Al, and nickel. Thus, Kohno et al directly exemplified and show with sufficient specificity the hydrogen absorbing alloy composition claimed by the applicant.

TABLE 7

Compositions		40
Example 45	$\text{Mg}_{0.31}\text{La}_{0.69}(\text{Ni}_{0.8}\text{Co}_{0.1}\text{Al}_{0.1})_{3.2}$	
Example 46	$\text{Mg}_{0.3}\text{La}_{0.5}\text{Pr}_{0.2}(\text{Ni}_{0.8}\text{Mn}_{0.15}\text{Si}_{0.05})_{3.4}$	
Example 47	$\text{Mg}_{0.27}\text{La}_{0.53}\text{Nd}_{0.2}(\text{Ni}_{0.8}\text{Mn}_{0.1}\text{Co}_{0.1})_{3.05}$	
Example 48	$\text{Mg}_{0.25}\text{La}_{0.75}(\text{Ni}_{0.85}\text{Co}_{0.1}\text{Fe}_{0.05})_{3.7}$	
Example 49	$\text{Mg}_{0.24}\text{La}_{0.76}(\text{Ni}_{0.8}\text{Mn}_{0.15}\text{Ga}_{0.05})_{3.65}$	45
Example 50	$\text{Mg}_{0.34}\text{La}_{0.66}(\text{Ni}_{0.75}\text{Co}_{0.1}\text{Mn}_{0.1}\text{Al}_{0.05})_{3.33}$	
Example 51	$\text{Mg}_{0.25}\text{La}_{0.45}\text{Pr}_{0.3}(\text{Ni}_{0.68}\text{Co}_{0.2}\text{Cu}_{0.1}\text{Zn}_{0.02})_{3.5}$	
Example 52	$\text{Mg}_{0.28}\text{La}_{0.62}\text{Nd}_{0.1}(\text{Ni}_{0.84}\text{Cu}_{0.1}\text{Sn}_{0.05}\text{B}_{0.01})_{3.3}$	

As to claim 17:

Kohno et al's positive electrode may also contain at least one oxide or hydroxide of metal selected from the group consisting of zinc and cobalt (COL 32, lines 49-62).

As to claim 18:

Kohno et al's negative electrode is a hydrogen absorbing alloy powder (COL 33, lines 5-10) and may further include La, Ce, Pr, Nd and Y (COL 11, lines 45-55). Examples 45-47 illustrates the inclusion of Co and Al as well (See EXAMPLES 45-47).

Example 45	$\text{Mg}_{0.31}\text{La}_{0.69}(\text{Ni}_{0.8}\text{Co}_{0.1}\text{Al}_{0.1})_{3.2}$
Example 46	$\text{Mg}_{0.3}\text{La}_{0.5}\text{Pr}_{0.2}(\text{Ni}_{0.8}\text{Mn}_{0.15}\text{Si}_{0.05})_{3.4}$
Example 47	$\text{Mg}_{0.27}\text{La}_{0.53}\text{Nd}_{0.2}(\text{Ni}_{0.8}\text{Mn}_{0.1}\text{Co}_{0.1})_{3.05}$
Example 57	$\text{La}_{0.57}\text{Pr}_{0.17}\text{Mg}_{0.25}\text{Ti}_{0.01}(\text{Ni}_{0.92}\text{Co}_{0.05}\text{Mn}_{0.02}\text{Al}_{0.01})_{3.54}$
Example 82	$\text{La}_{0.63}\text{Nd}_{0.1}\text{Mg}_{0.27}(\text{Ni}_{0.85}\text{Co}_{0.1}\text{Cr}_{0.03}\text{Fe}_{0.02})_{3.7}$

Kohno et al disclose a nickel-hydrogen secondary battery according to the aforementioned aspects. However, Kohno et al do not expressly disclose the specific additional element/compound of positive electrode.

As to claim 11:

Shinyama et al disclose Ni-based batteries using nickel hydroxide as the positive electrode, a hydrogen absorbing alloy as the negative electrode, and an alkaline electrolyte solution (ABSTRACT/P0002, 0019, 0022, 0038) wherein WO_3 is added to an electrode (P0068, 0092-0093, 0096, 0099).

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the art at the time the invention was made to use the specific additional element/compound of positive electrode of Shinyama et al in the positive electrode of Kohno et al as Shinyama et al discloses that the addition of W or W-based compound to the electrode prevents oxidation and degradation of the electrode material, and storage characteristics of the nickel-based battery are extremely improved, and even in the storage under high temperature, decrease of capacity by self-discharge is declined, and cycle characteristics of the nickel-based battery are improved. *Thus, the teachings of Shinyama et al apply with equal force to any electrode element regardless of its polarity.* Imperative to further note is that is well-known in the art that positive electrodes having such specific additional element are excellent in utilization factor of nickel hydroxide under atmosphere ranging from an ordinary temperature to a high temperature. Thus, such an additional element positively affects the charging characteristic of the electrode, particularly at a high temperature. *Furthermore, it is known in the art that incorporation of the foregoing additional element/compound in the positive electrode makes it possible to lower the rate at which the cobalt compound in the nickel hydroxide active material is dissolved and precipitated in the electrolytic solution. As a result, the overall structure of the positive electrode is rendered denser, thereby preventing other metals such as Mn, Al, Ca and Mg constituting the hydrogen-absorbing alloy which have been eluted with the electrolytic*

solution after prolonged storage from penetrating into the positive electrode, making it possible to maintain a good conduction network.

11. Claims 2-6 and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over: a) Kohno et al 6130006 in view of Noda et al 5527639; and/or b) Kohno et al 6130006 in view of Fleischer et al 2002/0122980; and/or c) Kohno et al 6130006 in view of Imoto et al 2003/0096166; and/or d) Kohno et al 6130006 in view of Sato et al 2004/0234865; and/or f) Kohno et al 6130006 in view of Shinyama et al 2005/0019657 as applied to claims 1 and/or 11 above, and further in view of the Japanese publication JP 10-261412 (heretofore 'the JP'412').

The preceding prior art references are applied, argued and incorporated herein for the reasons manifested above.

As to claims 4-6 and 14-16:

Additionally, Kohno et al's positive electrode includes a nickel hydroxide powder; and may also contain at least one oxide or hydroxide of metal selected from the group consisting of zinc and cobalt (COL 32, lines 49-62).

Kohno et al's positive electrode includes a nickel hydroxide powder; and may also contain at least one oxide or hydroxide of metal selected from the group consisting of zinc and cobalt (COL 32, lines 49-62). *Since Kohno et al disclose that conductive materials can be added to the nickel hydroxide, it is contended that the average valency behavior (i.e. higher than 2) of the nickel contained in the nickel hydroxide is a inherent characteristic thereof first because of the addition of more conductive material, specifically Co, which tends to alter valency upon*

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interaction with Ni, and second because during charging and discharging cycles the nickel hydroxide is compelled to take transitional states for electrochemical reaction purposes.

However, none of the preceding prior art references expressly disclose the specific Co-based coating and its specific high order-distorted crystal structure characteristics.

As to claims 2-3 and 12-13:

The JP'412 makes public that a positive nickel hydroxide positive electrode of an alkaline storage battery has a coating layer comprising a Co-based compound having a valence of more than 2 to cover the Ni-hydroxide particle, and a compound of at least one kind of element selected from a group consisting of at least Ca, Sr, Ba and Yb (ABSTRACT).

The JP'412 makes public that a positive nickel hydroxide positive electrode of an alkaline storage battery has a coating layer comprising a Co-based compound having a valence of more than 2 to cover the Ni-hydroxide particle (ABSTRACT).

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the art at the time the invention was made to use a cobalt compound coating on the nickel hydroxide of the positive electrode of the preceding prior art references as taught by the JP'412 because the JP'412 discloses that positive electrodes including such a coating material is excellent in utilization factor of nickel hydroxide under atmosphere ranging from an ordinary temperature to a high temperature. Thus, the cobalt-based layer on the Ni-hydroxide electrode material complements a better utilization of that electrode material.

Response to Arguments

12. Applicant's arguments with respect to claims 1-8 and 10-18 have been considered but are moot in view of the new ground(s) of rejection.

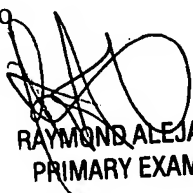
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Raymond Alejandro
Primary Examiner
Art Unit 1745


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